Nuances in the Translation of Science texts

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1. Introduction

Here in this chapter, the practical problems concerning the translation of scientific texts in a broad outline of formal and natural languages will be discussed. The characteristics of scientific texts and the need for translating science texts also will be discussed. Translating has traditionally been based on equivalence. Therefore, this view is changing. What is important in the translation of a text, nowadays, is not only the equivalence between words, but the translation of the main ideas, concerning the cultural background of the target language. In translating technical-scientific texts, one must first be aware of the accuracy of the translated text, in terms of how it transmits the goal of the writer of the source text to the reader of the translated text. Thus, the translated text will be able of contributing instrumentally to the technical-scientific area as a whole.

2. Translation of Science in Historical perspective

One can learn from Montgomery's book on "Science in Translation, Movements of Knowledge through Cultures and Time", the role of translation in the dissemination of scientific knowledge throughout the history. The translation of astronomy—as the oldest of sciences—constitutes a significant weight of documentary evidence of interlingual transfer, of translational norms which differ according to the receiving culture and the era. Equally importantly, translated texts are sometimes the only evidence of previous texts, which have been replaced through plagiarism; this approach to the dissemination of knowledge often resulted in the disappearance of the original text, although through reconstruction from different (translated) versions a hypothetical model of the original can be constructed. We learn how the translation of technical manuals in the Hellenistic era gave way to the study of rhetoric and the tools of persuasion as the means to humanitas and to social action through oratory, with a concomitant loss of materials conveying scientific knowledge. In the Roman empire, translation through rewriting (inventio) and as contamination (compilation of segments from different works) were two approaches adopted to the transfer of Greek literature and learning, with the aim of replacing these by Roman texts. In their narrow selection of scientific texts for translation, the Romans effectively excluded much of Greek thought—shades of Venuti and translation hegemony! Astronomy represented moral philosophy, descriptions of the universe and astrology, all of which were essential to the maintenance of a strong and far-flung empire. The benefits of enrichment to Latin through translation are not ignored.

The transfer of Greek thought into Syriac (form of Aramaic) was the precursor to its transfer into Arabic via the Syriac versions. Texts from Persia and India also contributed to Islamic astronomy, bringing together elements of Greek science, through translation into Arabic from various languages of knowledge already translated from Greek into these languages. Translation facilitated a continual exchange of knowledge. Europe of the 13th century began to acquire scientific knowledge in part through Arabic texts, with the increase of trade with Islam and the centres of Muslim life in Toledo, Granada and Cordova, with their activities in Translation.

The section on Science in the non-Western world takes into consideration the origins of science in modern Japan and how translators contributed to the introduction of Western knowledge, a transfer which took place under foreign influences during the 19th century in particular, by a process of adaptation and adoption, with split allegiances to different sources (e.g. both German and English for chemistry). Japanese Science in the making looks at different Western influences on the body of knowledge in Japanese, including Dutch, which the Japanese, through trade contacts, saw as a source

language, but which was in fact a repository of translated texts from English, Latin and other languages.

The Contemporary Context seeks to address the question of translation as a continuing formative influence in the making of scientific knowledge. The presumed universalism of scientific discourse may be an obstacle to the development of translation techniques; conversely, to consider the cultural and philosophical aspects, and the determining role of linguistic frameworks, is to accord translation of scientific texts its true weight of influence. The question of 'world Englishes' as a lingua franca for science, with the differing norms related to different forms of English, is illustrated by reference to scientific English in India, to Internet science and to geology (the latter being compared across English and French to see different stylistic features). Comparison of citation behaviour in English and Chinese highlights differences in approach, from respect of authority (greater borrowing, seen as plagiarism in the West) to textual structure and use of critical evaluation.

The history of language is seen as integral to the history of science, and the transfer of scientific knowledge across borders has generated language evolution and adaptation.

3. Language of science

The theme of language in relation to science can be developed in different ways. An interesting and potentially useful thematization is through the idea of translation. The notion of translation occurs sporadically in philosophy of science, but much of this literature merely glosses over the issue of translation. Even where translation is explicitly invoked, it is mostly understood in terms of what is usually called the naïve view of translation. Such an approach does not do justice to the philosophical complexity inherent in the idea of translation. It is by paying heed to the complexities inherent in the 'idea' of translation, which one realizes the intrinsic link between science and translation.

Similar to the suspicion which science has towards language, language itself harbors a suspicion towards translation. This has contributed to the view that translation is essentially a secondary activity, derivative and dependent on the idea of an original text. As much as the scientific discourse likes to believe that it can distill ideas outside the purview of language, so does the naïve view of translation believe that translations only change the language of the text but continue to keep its 'essence' intact. These beliefs reinforce the naïve view of translation, which, according to Andrew Benjamin (1989: 60), has 'two dimensions':

> First it involves the idea of recovery; of the recovery of a meaning, or truth, and the subsequent re-expression of what has been recovered. Second this understanding of translation also involves the idea of free exchange; of an unmediated and unrestrained economy in which signifiers are the object of exchange.

As mentioned earlier, the idea of translation can be found in the discourses on science, as in history and philosophy of science, although it has not inspired the detailed discussion that it should have. In the context of interpretation, there has been a more sustained engagement with this issue that has led to a substantial body of work on hermeneutic approaches to science. Here the idea of translation is implicit. Science is seen as reading the book of nature. This reading immediately implies the notion of translation and interpretation, which are usually used interchangeably in this context. Translation has also been explicitly invoked in the context of the incommensurability thesis. This thesis responds to the belief that theories in science are 'built' upon each other, thereby implying that the concepts and entities referred to in one theory remain the 'same' when used in another theory, although in a different context. Incommensurability about theories maintains that it will not be possible, in general, to translate a term from an old scientific theory to a new one, if by translation is meant the complete carryover of meaning in these terms

The problems encountered while translating a science text in a source language, say for example English into a target language say for example Tamil will be focused in the write up. We

need to understand the language of science (Thirumalai) before entering into the topic of translating science texts. The language of science is unique in its vocabulary, grammatical structure and discourse structure. This is discussed elaborately here under this heading.

The basic ground of a scientific study is the continuous relationship between a cause and its effect. In other words, whenever there is a cause, there is an effect. In this modern context, the term 'science moved away from its original definition and is presently used for areas of study which do not show the relationship between cause and effect in the traditional sense. Sciences such as political science, psychology, etc. fail under this category.

In the modern world, the areas of knowledge are divided mainly into three categories:

1. Natural science,
2. Social science and
3. Humanities.

The natural sciences study the natural phenomenon which is not man-made. Social sciences concentrate on the study of human behavior. The areas under Humanities try to explore the aesthetic and creative aspects of the human mind. In fact, these three categories are not mutually unrelated, but one finds a narrowness of approach in these areas of study. For instance, psychology on the one hand is related to the neuroscience and on the other to social science since the human being is created as the result of a natural process and the society controls his social behavior. This, to a certain extent, affects his psychological behavior. Similarly, in the case of sculpture and architecture, tools of measurement are derived from physical sciences. While the humanities deal with its aesthetic aspects. So far as the process of translation is concerned, it can also be treated as a scientific activity. As a scientist weighs his chemicals in an accurate balance and uses instruments such as microscope, telescope and the like for deciphering knowledge, a translator also uses instruments in his job such as dictionaries, grammar books, encyclopedias etc. A good translator makes a judicious use of his instruments as a scientist does of those available to him. A scientist exhibits scientific temper of mind. He has an open mind on issues and problems and seeks evidence from all sources. A translator, to be successful in his work, must exhibit open-mindedness and consult all resources available to him. He can't afford to be circumscribed, whimsical or emotional.' (Wanchoo, 1965)

A scientific text, which is original or translation, is different from other texts because the scientific text is factual and information-oriented. The language of a scientific text is clear, simple and unambiguous. Since science is objective in its approach, the language of a scientific text is also more objective and subjectivity of the author is kept out of it. It is said for the style of writing that 'style is the man,' implying that the personality of the author is reflected in this style of writing. This may be true in the case of literary genres such as poetry, short story, novel, essay, etc. but it is not applicable to scientific writing, especially in the case of natural sciences. This is why it is said that the language of scientific texts is not subjective but is objective.

Within science itself, the language may vary according to the area under study. For example, the language of mathematics may vary from the language of physics. However, both are objective in their presentation of the subject. In other words, the language of scientific texts is more scientific in making the texts more clear and unambiguous as opposed to the literary texts where the language is subjective. A plant-scientist in his effort to understand the structure of a flower disintegrates it into smaller units. In his description of the structure of the flower, he has to be specific and objective without any scope of deviation from facts. A literature, on the other hand, in his appreciation of beauty personifies a flower and is always subjective in his descriptions. Therefore, the language of a scientific text, as opposed to the language of literary texts, is factual in its content. Every word is concrete and real. The style is not figurative and the language is semantically single layered and less ambiguous.

The terminology used in scientific texts is semantically specific and therefore is referred to as technical terminology. By definition, it is exact, restricted in meaning and has referential meaning. The connotative meanings or suggestions have practically no role to play. Even common terms of spoken language, when used in scientific may get confused. In fact, in all the areas of scientific study, the use of scientific terminology is not only necessary but is also essential. Therefore, it is difficult for a common man to comprehend the scientific discourse because of his ignorance of the concerned subject matter. In scientific language there are several ways of defining terms. For example, the basic terms in mathematics are defined in the light of theory and theorem and on the basis of these very terms, the whole complex edifice is developed further and is accordingly defined. In other words, the technical terms of scientific texts are not developed in the natural course of language development but are deliberately coined and defined as per the need of the scientific discourse. In brief, the following features are found in the language of all scientific texts:

(1) Scientific language is diachronic and it is not affected by temporal consideration.
(2) Since technical terms are coined by the use of roots and suffixes of classical language, the language of scientific terms, therefore, tends to be hybrid.
(3) Surface level meaning is more important in scientific language than deep level.
(4) Its use is always restricted.
(5) Subjective elements are avoided to the extent possible and therefore, passive configurations are mostly used.

4. Need for translation of scientific texts

Science cannot manage without translation. Only mother tongue translators, who are highly-qualified and experienced, should be used in this highly demanding area of expertise. Many competent and specialized, qualified translators often have addition qualifications in the field of science too. If required, we would be happy to send you an immediate free quotation for the professional translation of scientific texts. Our competent, specialized, mother tongue translators would be glad to help you with translation from and to all languages.

The translation of scientific texts is an essential need in the modern Indian or Tamil context since most of the scientific texts are written in English, a colonial heritage, which is not the language of the masses; consequently, most Indians or Tamils are not in a position to take advantage of the scientific development within the nation and aboard. They do not get even the preliminary knowledge of scientific achievements. Due to its dependency on a foreign language for scientific learning, Indian or Tamil society has not made technical advances on par with the technically developed countries. To overcome this situation, it is necessary that our scientists should be encouraged to develop scientific writings in Indian or Tamil languages. Till such time, the only course left to us is to depend upon the translation of scientific texts which would not only contribute to our knowledge but also help us in the development and modernization of our languages. Language development not only means the development of vocabulary but also the uses of language in the domains of science and technology. Within the Indian or Tamil context, whenever scientific text is translated, the gaps in the terminology are filled either by coining terms into our own language systems or by borrowing terms from other Indian or Tamil languages. In this way, our languages develop scientific registers and become capable of expressing new ideas in new forms.

As stated earlier, the translation of scientific texts also contributes to the modernization of our languages. For instance, the translation of an ordinary book of 18^{th} century scientific text not only enriches the TL but also helps in its modernization.

Before tackling the problems of translating scientific texts, it is necessary to consider the ability levels of the target group, which is a decisive factor in the selection of appropriate equivalents such as words, terms, styles, descriptions, etc. in the translation process. It is obvious that the large student community, besides this group, there might be some smaller groups of people interested in

understanding the happenings of the scientific world for the sake of knowledge. From this point of view the scientific literature may be placed in three categories:

a. Text addressed to common masses. (Journalistic writings)
b. Student community (Textbooks, reference material)
c. Expert group (Research papers, dissertations, etc.)

The first category, i.e. scientific literature addressed to masses, may include reports, features, short notes, reviews, columns for general reading on scientific subjects, etc. As mentioned earlier, in the Indian or Tamil context, the main source of scientific knowledge is the English language. Therefore, to a certain extent, the scientific information remains restricted to educated elite. To spread this knowledge to the masses, the scientific texts written in English have to be translated into Indian languages or Tamil with non-technical terms and in an expository style. In this type of translation, the focus is on message rather than on the structure and style of the 'original text.'

The second category, i.e., the student community studying through the media of Indian languages also requires instructional material including textbooks, reference books, workbooks etc. in Indian or Tamil languages. The language to be used in such material has to be technical but should not be like the one used in the research papers written by scientists. All these textbooks and reading materials have to be developed by translating or adapting or adopting from English sources.

The third category, i.e., an expert group may not require translation as this group is already proficient in the English language. As such, whatever their research findings are, they contribute through English only. But if Indian or Tamil scientists someday decide to present their research findings in their own tongue, they will have to develop the necessary jargon and styles presented in it.

Keeping in view the constitutional obligations and the growing importance of Indian languages and Tamil our national life, efforts are being made by the governmental and non-governmental institutions to develop scientific and technical terminologies by preparing bi-lingual and tri-lingual glossaries, textbooks, etc. in Indian and Tamil languages. It is evident that for all these tasks, we have to depend upon translation only.

There are many practical problems of translation concerning scientific concepts and ideas from English into Indian languages or Tamil languages. It is almost impossible to develop scientific materials in our language without overcoming these problems. In other words, for proper exposition, description, discussion and presentation of the scientific concepts and ideas in Indian languages or Tamil languages, there are many practical problems that need to be combated properly. The following points should be considered before translating a scientific text.

1. The author
2. The subject matter
3. The translation method and
4. The reader

The original author is supposed to be the authority on the subject who is capable of expressing his ideas in his own language. Generally, scientific subjects fail under the category of specialized or expert knowledge and in its presentation, ideas are more prominent. The chain of ideas may represent the depth of the content. That is why the understanding of an idea will require previous and subsequent ideas. Otherwise, it may lead to ambiguity. Therefore, just as it is the responsibility of the author or the translator to present the previous ideas similarly, some understanding of the same is expected from the reader as well. Since the style is not an important factor in scientific writing, the personal information regarding the original author may not be relevant. As a result, the translation is restricted to its content only. But for the translator, it is essential to keep view of the level of understanding the subject matter, interest and linguistic competence of the reader. If the level of understanding of the reader is not up to the mark, some brief background/information of the translated

text must be given by the translator. The language of the translated text should be unambiguous and the presentation should be methodical.

From the practical point of view, the fundamental problems of the translation of the scientific text can be categorized as follows:

1. Basic knowledge of the subject matter
2. Problem of technical terminology
3. Abbreviations and symbols

5. Challenges for the Translation of Scientific Texts

Why is the translation of scientific texts more complicated than first imagined? There are a few reasons, but four of the main ones are:

- Scientific language is technical and can be difficult to convey across languages.
- Certain concepts may not exist in your target audience's culture so ideas need to be adapted carefully.
- Information needs to be as concise as possible, with few repetitions or ambiguities to mitigate confusion.
- Images including graphs, charts and diagrams must be localized and formatted for the intended audience

This is all on top of standard translation challenges including:

- Variances in word order and grammar
- Localization requirements for units of measurement reading styles
- A lack of standardized terminology
- Discrepancies among abbreviations
- The prevalence of dialects spoken by people around the world

6. Scientific translation difficulties

The main difficulty in translating a scientific text is the difficulty of interpreting the terminology used.It is specifically obvious when describing inventions and technologies that have not yet become widely used.In other words, a linguist, in addition to knowing the direct translation, must understand the general context and be well-versed in the area of knowledge to which the translated text is dedicated.

Moreover, it is important to take into account linguistic constructions and the manner of presentation adopted in the academic community of a particular country. Any deviation from the accepted expressions catches the eye of a native speaker and causes a negative reaction. So, the translator must use not only words being specialized terms, but also expressions used in the general technical field, the so-called "semi-professional" jargon.

The incorrect understanding of the text written by the translator or its incorrect presentation in a foreign language leads to confusion and distortion of the original meaning. Such problems are usually found in the articles translated by unqualified translators, who do not understand well what the paper is about. Only an expert in a specific field of knowledge must work on scientific texts.

7. Basic knowledge of the subject matter

While going through the translated scientific texts in Indian languages, one encounters a number of mistakes due to a lack of understanding of the subject matter; otherwise, the translated text may not be useful for the reader. The point is further explained with the help of some examples.

English original: Research is being done on the tissues of the animals belonging to the same species.

Tamil translation: ஒரே இனங்களைச் சேர்ந்த விலங்குகளின் திசுக்களில் ஆராய்ச்சி மேற்கொள்ளப்படுகிறது.

In this example, the translator has misunderstood the word ‘species’ as plural because of inal –s and hence translated as such. It will be all the more problematic and the English sentence of a scientific text needs expository translation rather than a literal one because of inherent structural differences between the source language (SL) and target language (TL). Look at the following example.

English original: The essential feature of species formation lies in the incompatibility of the genetic systems evolved by two isolated groups.

Tamil translated version1: இனங்கள் உருவாக்கத்தின் முக்கிய அம்சம் இரண்டு குழுக்களால் உருவான மரபணு அமைப்புகளின் இயலாமையில் உள்ளது.

Tamil translated version 2: தனிமைப்படுத்தப்பட்ட இரண்டு குழுக்களால் உருவான மரபணு அமைப்புகளின் இயலாமையில் இனங்கள் உருவாக்கத்தின் முக்கிய அம்சம் உள்ளது.

When we compare the two versions of translations given above, we find out that the first one is less understandable than the second version. The reason is that the first version tries to retain the structural pattern of the original English, whereas the second one adopts itself to Tamil pattern.

Nowadays some interdisciplinary areas of scientific studies like zoo-geography, biophysics, biochemistry, biotechnology, etc. are emerging; therefore, for translating such texts, it is necessary that, apart from a high degree of proficiency in the two languages concerned, the translator should also have a proper understanding of the concerned disciplines. If an individual is not competent to translate an inter-disciplinary scientific text, it may be useful to involve other experts of the concerned subjects in the progress of translation, so that all the aspects of the original text may be covered translated appropriately.

An example from an original text from Mathematics is cited below along with its translation to emphasize that a translator must be acquainted with the basic knowledge of the subject concerned.

A universal set is usually denoted by the letter U. We shall now use the diagram to represent sets. These diagrams will enable you to easily understand various operations on sets.

ஒரு உலகளாவிய கணம் பொதுவாக U என்ற எழுத்தால் குறிக்கப்படுகிறது. இப்போது கணங்களைக் குறிக்க வரைபடத்தைப் பயன்படுத்துவோம். இந்த வரைபடங்கள்கணங்களின் மீது பல்வேறு செயல்பாடுகளை எளிதில் புரிந்துகொள்ள உதவும்.

We usually use a rectangle to represent a set U. Elements of U are denoted by dots inside the rectangle. Elements of any given subset of U are enclosed in a circle or a closed region within the rectangle. When sets have a large number of elements, the dots are omitted, and only the closed region is shown.

ஒரு கணத்தைக் குறிக்க பொதுவாக ஒரு செவ்வகத்தைப் பயன்படுத்துகிறோம். Uஇன் கூறுகள் செவ்வகத்தின் உள்ளே உள்ள புள்ளிகளால் குறிக்கப்படுகின்றன. Uஇன் எந்தவொரு துணைக்கணத்தின் கூறுகளும் ஒரு வட்டத்தில் அல்லது செவ்வகத்திற்குள் ஒரு மூடிய பகுதியில் இணைக்கப்பட்டுள்ளன. கணம் அதிக எண்ணிக்கையிலான கூறுகளைக் கொண்டிருக்கும்போது புள்ளிகள் தவிர்க்கப்படுகின்றன, மேலும் மூடிய பகுதி மட்டுமே காட்டப்படும்.

It is obvious from the above examples that in the first para the language is quite simple, whereas, in the second para, where certain basic concepts have been dealt with, the language is technical. In the translated text, there is communication gap because the translator seems to be quite familiar with the subject concerned.

8. Problem of technical terminology

Technical terms are those words that are defined and used in specific contexts only; therefore, every subject has its own technical terminology. In the process of translation of scientific texts, the selection and use of technical terms are very important. Since science is developing very fast and new terms are created almost every day in English, it is necessary for the Indian languages and Tamil languages either to translate these terms by coining new words or any adapting them with little phonographic changes. The commission for scientific and technical terminology, Gov. of India, has laid down some useful principles which are as follows:

1. As far as possible, international terms should be accepted in Hindi and other Indian languages and transcribed, keeping in view the nature of the target languages. E.g.
    a. The terms for elements and compounds such as oxygen, hydrogen, carbon, etc.
    b. Units of weight and measurement such as gram, liter, meter, etc.
    c. The terms based on personal names such as Fahrenheit, voltmeter, ampere, etc.
    d. Constant such 'g'.
    e. The terms universally used such as radio, petrol, T.V., radar, electron, proton, neutron etc.
    f. Mathematical signs and symbols such as Sin, Cos, Tan, Alfa, Beta, Gama etc.
2. Abbreviation of terms may be used, such as in the Roman script only and their international form may be maintained.
3. Letters of Indian alphabets may be used in geometrical figures, but in Trigonometry, Roman or Greek letters should only be used, such as Sin A, Cos B, Tan C etc.
4. Conceptual words should be translated.
5. Indigenously coined terms such as 'taar' or 'mahadwip' for continent may be retained. In translation, while selecting an equivalent, one should particularly keep in mind the factors such as semantic specificity and comprehensibility of the item concerned. One should avoid puritanical and anti-reformist tendencies.
6. The objective should be to achieve maximum uniformity in technical terminologies in all the regional languages (Aggrawal 1967: 88-89).

The major aspects of the translation process of technical terms of science and technology are borrowing foreign terms and standardization of native vocabulary. Apart from this, the internalization of foreign, mainly English, terms and rules for uniformity of the transliteration should also be laid down. In its absence, anarchy might prevail, for instance, in a dictionary from English to Indian language term calorie is spelled in various forms in Devanagari as *kelari*, *klari*,*Kelari*, and *kailori*, then choosing the right term becomes difficult for the translator.

Apart from this, the rules of affixing Indian languages are foreign terms that may also be clearly specified. To be more specific, one should clearly understand that in translation process if one has to borrow a technical term from SL into TL. It should be changed accordingly to the natural phonetic structures of the latter. The committee of scientists and linguists, contributed in 1950 by the ministry of education, Govt. of India to look into the standardization of the scientific and technical terminology in Indian languages had also resolved that 'International terms should be adapted in Indian languages and should be assimilated in keeping the phonetic genius of the latter.'

In this connection,, few scholars have been of the opinion that 'These terms should particularly be taken over in their current English form and transliterated in such a way that there should be a uniformity of pronunciation in all the Indian languages (Saksena, 1967: 22).

Keeping all these controversies in view, the ministry of education, India again appointed a committee of linguists in 1951 which recommended that 'Words of modern origin and coined words used internationally as technical terms should generally be adapted in Hindi and other Indian languages in the forms in which they are used in English book, e.g. *gas, penicillin, quinine, plastic*, etc.

While looking at the scientific and technical terminologies adapted from English into Hindi one notices that the number of terms in TL in their original SL form is very few. 'In fact, most of the terms have undergone a change both in spelling as well as pronunciation and its main causes have been saving of effort where difficult sounds are substituted by simpler ones. Many examples can be cited form Indian languages where phonetic changes have taken place due to stress-shifting during the course of borrowing form SL, e.g. *hydrogen* (SL) – *hydojan* (TL-Hindi)

Regarding this, one may raise a basic question that during the process of borrowing, is such adaptation a linguistic necessity? In this context, Edward Sapir, a well-known American Linguist, has observed that 'The borrowing of foreign words always entails phonetical modification. There are sure to be foreign sounds or accentual particularities that do not fit the native phonetic habits. They are then so changed as to do as little violence as possible to these habits.' (Sapir 1921, Quoted from Saksena 1967, 23)

In fact, the borrowed terms are simplified in TL during the natural course of usage. For instance, 'quinine' has already been simplified in Hindi as *kunain* and *koyanel* in Marathi. Likewise, all those borrowed terms whose composition and sequence of letters are not familiar to our writing systems may undergo a change in due course, particularly al the phonetic level.

Keeping all these things in view, it may be advisable for a translator of scientific texts to accept only those forms of borrowed technical terms which are simplified and popularly used by the target language. In this connection it may be relevant to quote the words of Otto Jesperson, a great Danish linguist; 'The more familiar such loan words are, the more unnatural it would be to pronounce them with foreign rules of quality and stress, for this means, in such cases a shuting of the whole speech apparatus on to a different track for one or two words and then shifting back to the original basis of articulation. An effort that many speakers are quite incapable of and one that is many cases interfere with the natural and easy flow of speech. (Jesperson 1922 quoted from Saksena 1967 25).

9. Abbreviations and symbols

The language of science is not only a mere cluster of words but also it has notions, abbreviations and symbols—for example, DDT, AIDS, etc. Therefore, the translator also faces the problems of translating these abbreviations and symbols. Some of the basic challenges posed before the translators are which of the abbreviations and symbols should be translated and which have to be retained as such. For example, the full form for the abbreviation AIDS is 'ACQUIRED IMMUNO DEFICIENCY SYNDROME' which can be translated into Hindi this 'arjit pratikaksha ahaaav rog'. Likewise the abbreviation DDT denotes three chemical components. So translating such abbreviation in TL may create more problems for the reader. Therefore it is advisable only transliterate these in the TL in their original SL forms.

The language of science has simplified structures that aim to achieve one word one meaning correspondence. Several linguists believe on that this kind of relationship can also be applied in other areas. Citing an example from grammar, David Crystal says it is more clear and convenient to write; > Su Pc (A) instead of writing: 'a sentence in English normally consists of a subject, predicate complement and adverbial, the latter being option.''.

10. Translator's responsibility

Many novice translators confuse technical and scientific translation of texts from/to a foreign language. Despite the general similarity, scientific translation is considered to be one of the most difficult types. This type of translation is usually used for the presentation of texts for the purpose of

their further publication in scientific journals or presentation at scientific conferences. It is important to correctly translate and construe all terminology present, observe the form of presentation and use the most accurate and concise verbal constructions. What are other differences between the translation of scientific texts and the technical translation?

Scientific texts are usually written for experts around the world and contain important study findings, investigations and research results. They are written using scientific language and often contain a multitude of field-specific terms. Universities, colleges and research institutions rely heavily on professional translators, who translate scientific texts accurately.

The content of the text and reference to the current state of research and literature must be conclusive, correct and consistent. Because the contents of these field-specific texts and their translations are often used in science by further authors or quoted as sources in the preparation of one's own new scientific literature, accurate translation is of considerable importance. The scientific translation, therefore, may not contain any errors and must be prepared with great care by a competent, qualified translator. Scientific translators have a great responsibility for the accuracy and reliability of their texts, as scientific works often continue to be read for many years after publication, as well as excerpted, quoted and used in further work by other researchers and research facilities or institutes in other countries.

11. Conclusion

The complexity of scientific and technical translation lies in its very essence, and it lies in the necessity to translate highly specific terminology. Apart from understanding the terminology itself, the translator must understand the context where it is used for sometimes it is exactly the context that the use of a particular term depends on. Additionally, in terms of translating scientific and technical literature, it is necessary to mention the strictly developed phraseology adopted in this field. This phraseology is used in order to ensure that professionals immediately notice the necessary details (information or a guide to an action). Any deviation from the language adopted among specialists in the field is immediately noticed, resulting in the sense of unprofessionalism on the translator's part. "Well-established documentation language" refers to the use of the same words and expressions, not only in terminology but also in the spheres of general technical and everyday language, a specific type of semi-professional jargon. Replacing these expressions with synonyms is unacceptable.

Additionally, the specific character of translating scientific texts is that a misperception of the meaning of the text by the translator and / or incorrect use of terminology can lead to a complete distortion of the meaning in the translated material. Such shortcomings can be found in texts translated by a translator who has not entirely understood what the text was about or was not familiar with the terminology used in it.

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